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SERIES.

G.O. No. 953
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Dated 13.9.49
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[Despatch Abstract.]

AGRICULTURE : TEXT BOOK ON SOIL EROSION : REVIEWS IN SCIENTIFIC JOURNALS AND NEWSPAPERS : PAPERS RECORDED.

FOOD & AGRICULTURE DEPTT.

0 The file deals with the reviews on the text book on Soil Erision by the editors of the jounrals to whom the book was sent for review. The comments so far received will be found at C. Some of the editors of jouarnals have not yet sent their comments. A.S. has ordered that there is no need for any more reminders and the file closed as soon as possible.

The Editor, Jounral of the Agricultural Research, United States Department of Agriculture, Washington, D.C. and the Editor, "Soil Conservation", Soil Conservation Service, United States Department of Agriculture, Washingbon, D.C. reported that they did not receive the complementary copy of the text book on soil erosion. The Superintendent Government Press originally supplied to Government the copies intended for despatch to the above two editors. The copies were promptly despatched. Presumably the copies might have been lost during transit. The Superintendent, Government Press, has now stated that he has supplied another copy to the Editor, Jounral of the Agricultural Research mentioned above. As regards the supply of the book to the Editor, "Soil Conservation", the Superintendent, Government Press has not yet sent his reply to the Memorandum at pp 129-130 c.f. The draft Memo below is for approval. As no other action is pending in this file, the papers may be recorded with a C.B. entry on 22nd September 1949 after issue of the draft, to watch the Superintendent, Government Press's report with ref. to "K" above.

id to supply another copy to them.

N.M.M./7.9.1949

Abstract

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AGRICULTURE - Text Book on Soil Erosion - Reveiws in scientific journals and newspapers - Papers - Recorded.

G.O. (Ms) No. 953 F.&.A. dated 13th September 1949

/True copy/

R. Thiagarajan
C. 12.

Office Assistant,
Madras Record Office, Egmore.

26/11/53

GOVERNMENT OF MADRAS
Public Works (Information and Publicity) Department.

official Note dated 10th September 1948.

With the compliments of the Director of Information, Government of Madras.

(May be published without acknowledgment.)

SOIL EROSION - ITS PREVENTION AND CONTROL.

The control and prevention of soil erosion is a subject of great national importance. Yet how many among us are aware of the dimensions of this problem, or pay any heed to it, let alone taking effective measures to combat the menance! Archeaological Research has now well high established that even the course of civlizations had been affected by this inexorable process of nature, converting well developed and cultivated lands into virtual deserts, lands of drifting sand. Even in modern times there had been spectacular instances of soil erosiion forcibly drawing the attention of the public to the need for soil conservation. In our own presidency the problem of soil erosion has to be faced and tackled in such areas like the Ceded districts, Bellary, Tinnevelly, Nilgiris and other dry cultivated lands scattered far and wide. In the Nilgiris, the worst affected area in the Province, the clearance of natural forests to form plnantations has resulted in severe soil loss which can never be replaced.

National reconstruction is today the duty of the people and the Government alike. The question of saving the soil from the destructive processes of nature is as sharp a prblem as any other. And so let us first try to understand the problem from both the points of view, of disagnosis as well as cure.

The soil which is the uppermost weathered and disintegrated layer of the earth's crust is reponsible for all plant growth. It supports all animal and human life. It is a primary duty of man to protect this layer of soil and to see that its fertility is maintained. Soil erosion is the lossening of this soil from the bed and the ~~transmission~~ transportation of soil material from one place to another. This takes place through the action of wind or water in motion.

Geologic erosion is a slow natural process taking place in an undisturbed environment. It is not of much consequence so far as its effects on agricultural lands are concerned. Accelerated erosion takes place when vegetation is removed and land put under cultivation disturbing the balance between the soil and its vegetational covey. Erosion on cultivated lands is of this type.

Wind and water are the two agencies that cause erosion. Whenever soils without cover of vegetation in a dry state are exposed to high winds we have wind erosion. The fine particles of the soil are lifted and carried to great distances. Erosion ~~of the soil~~ due to water is the more serious and extensive type that occurs in many parts of the Madras Presidency, notably in the coastal districts, the black soil areas of the Ceded districts and in the hilly tracts of the Nilgiris. Two fundamental types of water erosion are "sheet erision" and EGullying." In the case of sheet erision, movement of runoff water and eroded soil takes place in sheets, approximately the same amount of soil being removed from each place. When this moving mass assumes sufficient velocity it has a cutting action on the soil. If there is any depression at all in the field, a gully forms where the mixture of the soil and water collects at a high speed. The runoff water carrying the surface soil flows down to gully with over-increasing velocity. If the velocity of the runoff water is doubled, its envery is increased four times and its cutting action on the soil is correspondingly increased; its capacity to carry in suspension soil material is increased sixty-four times. The gullies tend to deepen and widen with every rain-fall. They cut up agricultural land into small fragments and make them unfit for cultivation in course of time. Stream ~~erison~~, Debris Avalanche, Debris slides and caving, subsidence and erosion by waves are other types of erosion capable of working havoc on the soil in different degrees.

Now that we have, to an extent, grasped the nature of this menance, let us have an idea of the extent of control, man can exercise over it. To assist the people as well as departmental officers, the Government of Madras have brought out a publication dealing mainly with the preventive measures so far experimented and found successful. The book is the product of the combined efforts of the Heads of the Departments of Irrigation, Agriculture, Forest and Public Health who formed an Editorial Committee presided over by a Chief Editor.

In the chapter dealing with the question of erosion control in Agricultural lands, it is said "The simplest form of soil stablisiers are small wattle-work revetments 15.30 feet long held by stout pegs and staggered throughout the danger zones. Where available, rough stones may be formed into small bunds in front of such revetments. Where conditions are suitable shrubs can be used to form natural revetments by cutting and pegging them down with crowns uphill. On steep slopes where the soil is more unstable rough stone or even pucca masonary revetments may be needed. The remedial measures now adopted all over the world to prevent or reduce surface runoff and soil erosion and increase crop production, consist of contour bunding, contour trenching, gully plugging, terracing, regulated forestry, controlled graxing, revegetation, selective weeding, cover cropping, mixed farming, crop rotation, strip cropping, etc. The first three methods are mechanical and the rest are biological in operation."

Summing up the Chapter on contour bunding the book says: "Contour bunding schemes aim directly at putting the entire rain-fall on the bunded lands, preventing runoff altogether, stopping erosion of soil, and increasing soil moisture in quantity and duration and thus helps good crop production."

Contour trenching is excavating trenches along a uniform level or at a particular contour across the slope of the uncultivable waste in the top portion of a catchment and forming bunds at the trenches primarily to protect the contour bunds lower down from the runoff of the upper portion of the catchment. By this methods rain water is held up in the slopes for a long time and growth of natural vegetation is accellerated in the slopes. The rain water percolates through the soil slowly and travels down and benefits the better types of lands in the middle and lower sections.

Terracing steep slopes of cultivable lands is one of the many mechanical methods of controlling soil erosion. In principle, terracing is essentially a process of constructing a series of drainage channels across the slope of hill sides whose function is to collect runoff water before it attains harmful velocity and conduct it slowly to an erosion proof outlet. The drainage channels which interceps the runoff and prevent its rapid flow down the slope are formed by throwing low and broad embankments called terraces. The three types of terraces recognised are "the guide row", "the level bench" and the "mangum terrace."

Contour bunding, contour trenching and terracing mentioned aboye are all mechanical ways of preventing or minimising soil erosion and these may be likened to curing a patient by operation. The other methods of control of erosion by regulated forestry, regulated grazing, revegetation, cover cropping, etc., are biological and may be likened to treating a disease by dieting or reinforcing good healthy by temperate living.

Control of erosion through crops or vegetation is the biological method of control. Vegetation is nature's protection against erosion. A cover of grass is five times more effective than bare soil in the control of runoff waters and 65 times more efficient in the control of soil losses. It is only when the natural vegetation is removed and land put under cultivation that erosion becomes excessive. But this is a necessary step in raising crops. Having put the land under cultivation we should take all possible measures to see that erosion is kept at a minimum. The principle of biological control of erosion is that cultivation of crops should be done in such a way that the maximum protection to the soil is offered for as long a period as possible during the rainy season. The effect of a cover crop on the control of erosion is considerable.

This is just an attempt to invite the attention of the people to the manifest aspects of a problem vitally affecting our interests. The soil of the land demands our attention. It is our duty to safeguard it.

REVIEWS BY SCIENTIFIC AND OTHER JOURNALS ON THE TEXT BOOK ON SOIL EROSION.

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"Hindu" dated the 13th September 1948.

"CONTROL OF SOIL EROSION."

The Government of Madras have brought out a publication dealing mainly with the preventive measures so far experimented with for control of soil erosion. The book gives the results of the success of the experiments carried out by experts, connected with the Departments of Irrigation, Agriculture, Forest and Public Health. It deals with the manifold aspects of this problem which is of great national importance.

"Statesman" dated 6th September 1948:

"SAVING THE SOIL."
Soil Erosion, its Prevention and Control (Government of Madras - Rs.6).

This useful publication authoritatively discusses a subject of great and increasing importance to Indian agriculture. It describes and illustrates the various types of erosion, and gives detailed instructions for combating it, whether by contour bunding, terracing, afforestation, preservation of grassland, or scientific crop rotation.

"Indian Forests" dated 11th September 1948.:

"Soil Erosion - Its Prevention and Control" 1948, Government Press, Madras. i-xii, 1-184, 58 figs. Price Rs. 6.

This publication is intended to be a text book on soil erosion for the use of Departmental officers and for teaching in the agricultural and forest colleges. It has been complied by a Committee consisting of the Heads of the Departments of Irrigation, Agriculture, Forest and Public Health, presided over by Shri L. Venktakrishnan, as the Chief Editor.

Examples are cited in the introduction to point out that effective methods of exploiting natural resources by man have resulted in disastrous erosion, and even the wiping out of civilizations of high degree.

Among the causes of accelerated erosion the first one considered is the nature and distribution of rainfall. In the Ceded districts out of about 20 inches of rain, 12 are received in the quarter August to October, whereas the ground in agricultural lands is fallow between April and September or October. Cotton is not sown until September and Sorghum not till the end of the rains in October. Early crops like Setaria or groundnut sown in June or July besides affording protection will enrich the soil for the later crops, that can be intercropped.

The next is the effect of land slope. It is generally unwise to cultivate lands above a critical slope, taken as between 1 in 4 to 1 in 7 according to the local conditions of soil and climate. We should add that valleys and slopes carved out of starigraphic tilts are in a class by themselves in the critical state contemplated here and even in forest systems are only best tackled by some form of the Dauerwald system.

Interesting details are given in the following chapters relating to Contour Bunds, Trenches, Afforestation, Dry Farming, Gullies and Check Dams, Control of Stream Banks, Wind Erosion and finally a Chapter on Erosion and Malaris.

"Indian Medical Gazette" of October 1948.

SOIL EROSION : ITS PREVENTION AND C
L.Venkatarksihnan, published by the Government of Madras, Government Press, Madras, pages xii plus 184 - Illustrated - Price Rs.6

This attrative and well-written book has been compiled by an Editorial Committee of experts whose names have not been mentioned. The Chief Editor, is L. Venkatarksihnan, the distinguished Engineer who has designed and built many irrigation and river training works in the Madras Public Works Department.

The subject has been dealt with from various angles, irrigation, agricultural economy, forestry and health; and the book contains a wealth of information pertaining to India and plenty of technical data. The engineering aspects of soil erosion and soil conservation have been emphasized and dealt with more exahustively than the rest. Some of the control measures can be put into effect only by Governments as they are beyond the technical and financial resources of the average farmer with a small holding.

The book contains a Chapter on "Erosion and Malari" which tries to cover the entire field of anti-malarial engineering in a short compass. In this connection, one wonders whether the instructions contained in the note under figure 63, page 56, "The burrow pits should all be marked on the upstream(or down-stream side)" has been made with due regard to malaria control. Such a pit is likely to hold water for a longer period than necessary and may promote malaria in the foot-hills whereas if the burrow pit is formed by scraping the sidelong ground on the down-stream side, it will not hold water, will not produce malaria and this will not weaken the bund appreciably.

"Science and Culture" of February 1949:

SOIL EROSION : ITS PREVENTION AND CONTROL - Government of Madras - 1948.

Soil erosion as a problem of national importance has only recently been recognised in India. The extensive nature of the damage caused by soil erosion requires a coordinated attach by agronomists, irrigation engineers and forest officers. The volume under review is in this respect an authorititative treatise since it is the outcome of a concerted effort by experts. A soil scientist of today will, however, fail to find much of the relevant topics so far as the soil aspect of erosion is concerned. Illustrative chapters dealing with the control of erosion are expected to be very helpful to field workers. Another important feature of the volume is that the suggested methods are either tested with Indian soils and under Indian conditions or are especially meant to be applicable to them, although in many cases only local problems have been cited. The almost faultless printing and get-up including sketches and photographs go to the great credit of the publishers.

"The Mail" dated the 26th March 1949:

Soil erosion has gone from pre-historic times. It is caused very largely by the destruction of forests for the sale of timber, or to cultivate forest land with food crops. Especially has this been the case in countries like America, Africa, India and Australia, where agriculture has expanded rapidly.

The book under review examines the chief causes, erosion of extensive tracts in India and the methods to be adopted for its prevention and control.

The extent to which erosion has occurred in parts of the Madras Presidency is referred to in detail in the book. There is lot of evidence to prove that the beds of the Cauvery river in Trichinopoly and Tanjore, and that of the Hagari river, draining the hills to the South of Bellary, have gradually risen. The beds of the Pennar, the Palar the Bharatapuzha, and of several rivers on the West Coast, like the Periyar and the Manimala have been choked with sand. They are glaring examples of the havoc caused by the destruction of forests. The Nilgiris present an astonishing spectacle of such loss. Here, in the name of the "Grow More Food" Campiagn, lands have been leased for the growing of potatoes and in place of the old vendure we now see only bleak hills. In like manner, thousands of acres in Tinnevelly have been engulfed.

There is in forestry a well-known adage "What we sow we don't

reap and what we reap we don't sow." This has to be well remembered in the interests of posterity.

Many mistakes have been made in the past in the alienation of land from public to private interests in the Presidency. Examples of misuse of land are seen in some of the Agency areas. Planned use of land sets right mistakes of the past and makes possible a future in which the fertility of the soil will no longer be dissipated by misuse. It makes long-term conservation planning by correlating soil science with social sicence into a single public soil policy. Lands on steep slopes should not be cultivated. To cultivate without terracing such slopes is soil suicide.

The measures suitable to stabilize the soil are described in detail in the book. The remedial measures now adopted all over the world to reduce surface run off and soil erosion, and increase crop production, consist of contour-bunding, contour-trenching, gully plugging, terracing, regulated forestry, controlled grazing, re-vegetation and selective weeding. The first three are mechanical and the rest biological in operation. Special emphasis has to be laid on re-afforestation for which it may be desirable to constitute a separate Forest Circle, as it is the function of the Forest Department to implement such work successfully.

The effect of large-scale contour-bunding is seen in Bijapur where about 10,000 acres of land have been bundred at a cost of Rs. 12 lakhs. It has prevented run off altogether stopping erosion of soil, increasing soil moisture and thus has contributed to increased crop production.

~~The effect of large-scale contour-bunding is seen in Bijapur where~~
In a land of large forests and extensive river systems, it would do well to follow in the wake of America. Here a chain of experimental stations dealing with the problem of erosion has been established and a large mass of data collected. Wide publicity is given to them and farmers are encouraged to form soil conservation districts which practice on co-operative lines the various control measures advocated by the soil conservation service which deals exhaustively with erosion from the point of view of agriculture, forestry and engineering.

The book has been richly illustrated and is a valuable addition to the literature on the subject. The work could not have been entrusted to an abler hand than Mr. L. Venkitakrishnan who has made his mark as the Irrigation Chief Engineer of the Province.

"Journal of Scientific and Industrial Research" of January 1949:

q SOIL EROSION : ITS PREVENTION AND CONTROL-(Superintendent Government Press,Madras) - 1948.

This is a TEXT BOOK ON SOIL EROSION published by the Government of Madras for the use of departmental officers and for teaching the subject in the agricultural and forest colleges. It has been compiled by a committee consisting of Heads of the Departments of Irrigation, Agriculture, Forest and Public Health, appointed by the Government of Madras.

Erosion has been taking a heavy toll of the soil every year. The extent of its ravages can be judged from the vast tracts of lands that have gone out of cultivation and others whose potential fertility has been reduced to a very low level. The continued existence and prosperity of the country depends on its ability to maintain its productive agricultural land. The control and prevention of soil erosion is, therefore, a subject of great national importance. The present compilation by experts on different aspects of soil conservation will go a long way to meet the demand for a good reference book for workers in the field of soil conservation under Indian conditions as well as for a good text-book on soil erosion for use in agricultural and forest colleges.

The book contains 18 chapters, 2 appendices, bibiliography, glossary, index and 158 illustrations.

The introductrcy chapter of the book deals with factors of soil formation, with a general historical account of soil erosion, and describes the problem of erosion in India in general and in Madras in particular. Chapter II deals with the causes and results of soil erosion

with interesting illustrations and examples from India and the United States of America. Chapter III deals with the chief causes of accelerated erosion in agricultural soils, such as intensity of rainfall on the catchment, size and shape of the catchment, slope of the land, vegetations, etc., and the experimental technique used for the determination of run off and soil losses. The next four chapters deal with the mechanical methods of erosion control such as contour bunding, contour terracing, trenching, terracing and contour ridging. Chapters VIII and IX deal with conservation of grass land and shifting cultivation on hill slopes. Chapter X deals with the biological methods of control of erosion such as regulated forestry, regulated grazing, cover cropping, mixed farming, crop rotations, strip cropping, etc. and the experimental results at the Sholapur and Bijapur farms in Bombay, and Hagari farm in Madras are enumerated. Chapter XI, XII and XIII deal with control of gullies, check dams and permanent soil-saving dams respectively. The material has been prepared so that it may be used by individuals having a limited degree of engineering training and experience. Chapter XIV deals with the special use of vegetation in gully stabilization. Subsequent chapters deal with control of stream and river bank erosion, control of wind erosion, control of floods, and erosion in relation to the spread of malaria. The book ends with a map showing annual average rainfall in India and average monthly and annual rainfall of the Madras Presidency.

The usefulness of the book has been enhanced by the inclusion of good illustrative photographs. The get-up and print are attractive.

A chapter might have been devoted to soil conservation survey and land use classfification which are very necessary before planning for maximum safe land use and for adopting wide-scale anti-erosion measures. This suggestion may be considered in revising the book for the second edition. Comparatively greater emphasis has been laid on the engineering aspects of controlling soil erosion. It is suggested that the biological methods of controlling soil erosion may be described more fully in the next edition.

The book is useful and a copy should be kept in the bookshelf of every worker engaged in soil conservation and general agricultural development.

Bureau of Hygine al...

Madras Government of - Soil Erosion - Its Prevention and Control - pp-xii - 184, 159 figs and 1 folding map - 1948 Madras Government Press (6 rupees).

This book, complied by the former Former Chief Engineer for Irrigation and the Heads of the Departments of Irrigation, Agricultu Forestry and Public Health, Government of Madras, is intended primar for departmental officers and for teaching agriculture and forestry. Most of the figures are from photographs taken in Madras, the United States of America and other countries.

In the final chaper, on erosion and malaria, it is pointed ou that the problem of erosion and its control is in fact one of regula ting the flow of water, and therefore has an important bearing on malaria. After an introductory account of malaria and its transmissi some effects of erosion are mentioned; by making ground uneven and by promoting scouring and intermittent flow in steams it causes pool to form, and by increasing run-off from hills it floods lower land. account of engineering methods of mosquito control, familiar to mala logists, follows. On page 153 "varieties" of mosquitos would better be written as general, and on page 160 the "filling of all points" perhaps refers to ponds.

To medical officers of health the main body of the book should be useful in showing what is being done to check erosion. They can then foresee any consequent increase of potential breeding places of mosquitoes, for example in water held up by certain types of terraces and dams, and can plan control measures accordingly.

D.J.Lewis.

American Society of Agriculture Research, 20th April 1949:

SOIL EROSION & ITS PREVENTION AND CONTROL - Cloth XII - 184 pages 6¼ x 9¼ inches - Illustrated and indexed. Government of Madras, 6 Rupees (copies may be obtained from the High Commissioner for India, "India House", Aldwych, LONDON.W.C.2)

Chapers cover the introduction, soil erosion - causes and results, chief causes of accelerated erosion in agricultural soils, methods of control, contour bunding (terracing), contour trenching and afforestation, dry farming and terracing, conservation of grassland, control of shifting cultivation on hill slopes, other methods of controlloing soil erosion and surface runoff, control and elimination of gullies, check dams, permanent soil-saving dams, special use of vegetation, control of stream and river bank erosion, control of wind erosion, control of floods, and erosion and malaria.

The "Engineer" dated 25th March 1949:

SOIL EROSION : ITS PREVENTION AND CONTROL - Chief Editor, L.Venkatarayanan, Madras - Government Press, Price 6 rupees.

This book has been prepared as a textbook for the use of departmental officers and other concerned with the prevention and control of soil erosion and for teaching the subject in the agricultural and forest colleges of Madras. References are made to the incidence and control of soil erosion in various parts of the world and those are amply illustrated by photographs. A general description of the causes, extent, and consequences of soil erosion in the past and at the present time, is given, and this is followed by a number of chapters on methods of control and elimination; for example, by contour trenching and afforestation, terracing, correct farming methods and the use of dams. There are also chapters devoted to wind erosion, the control of floods, and the relation between soil conditions and the spread of malaria. Finally, there is an appendix of rainfall statistics for Madras and a bibliography.

"Engineering News Record." - ~~Acknowledgement.~~

SOIL EROSION & ITS PREVENTION AND CONTROL - 184 pp - By the Development Department, Government of Madras, Government Press, Madras, India - Price 6 rupees (Approximately $ 1.81.)